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ABSTRACT

Sensitivity to story information that conflicted with expectations was examined in kindergarten, second, fourth, and sixth grade children. The children either read or listened to stories about familiar events. One story was consistent with children's "scripts" for these events, while the other story contained script-inconsistent information. All participants were questioned about the stories immediately and one week later. Equivalent proportions of students detected the anomaly initially and at recall: but listeners had more difficulty noticing inconsistencies than readers. Older students recalled more story information, and they remembered consistent stories better than inconsistent stories. (Author/RL)

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Children's Awareness of Script-inconsistent Story Information

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By now, evidence has accumulated (Nelson, 1978; Nelson & Gruendel, 1979; Myers, Note 1; Pace, Note 2) that even preschool children can demonstrated accurate, organized knowledge about everyday events and experiences. The existing experimental literature (e.g., Anderson, Reynolds, Schallert, & Goetz, 1977; Anderson, Spiro, & Anderson, 1978; Bower, Black, & Turner, 1979; Thorndyke, 1977) has also shown that world knowledge is an important component of text comprehension and significantly influences how passages are processed, understood, and remembered. Previous work by this investigator (Pace, Note 2) indicated that kindergarten children, as well as those in higher elementary-school grades, could use their knowledge of repetitious, commonplace events to comprehend stories about such situations.

However, this prior investigation could not reveal whether these children were using story information or their own knowledge for comprehension since the information in the stories was comparable to that in the children's "scripts" (Schank & Abelson, 1975, 1977) -- or their organized, sequential knowledge about such events. Since most prose passages are not isomorphic with such scripts in that they contain information which cannot be derived from existing knowledge, an important component of comprehension would seem to be the ability to distinguish between what one knows and what a story or other prose selection says. Furthermore, this ability may be one which shows developmental differences in that older school-aged children may be better able to make such a distinction than younger ones. The previously demonstrated facility of

even kindergartners to comprehend well stories about highly familiar situations may simply reflect the rather effortless utilization of highly organized existing knowledge and not demonstrate sensitivity to passage information itself. This is a crucial distinction for understanding comprehension, since, as Bower et al. (1979) have recently acknowledged, it is the unusual or unexpected situation or event which makes a story interesting, not the recitation of the ordinary or expected. In fact, to repeat unnecessarily information that is assumed to be known could be viewed as a violation of Gricean conversational principles (1975) applied to narratives. Thus for children to comprehend successfully the kind of stories or other prose passages they might normally encounter they must be aware of information not derivable from their own scripts.

This study, then, attempted to determine whether children of different ages initially were aware of story information which conflicted with usual expectations for events and, in addition, whether, over time, they might make anomalous stories conform more to their own expectations if they were to exhibit reconstructive memory processes (Bartlett, 1932). Brown, Smiley, Day, Townsend, and Lawton (1977) demonstrated that school children's existing knowledge does get confounded with story information. These authors, however, used stories which were not directly related to children's own knowledge, and recall was assessed immediately following story presentation. This study, on the contrary, assessed recall of both script-consistent and script-inconsistent stories one week following initial presentation. Also, the amount of information recalled for both kinds of stories was compared, with the expectation that script-consistent stories might produce greater recall since information could

be constructed from existing knowledge. The effect of oral versus written story presentations was also assessed since Olson and Hildyard (in press) have argued that written texts may be better able to present information that cannot be derived from existing knowledge alone.

Method

Materials

Two forms of two different short stories were written about situations which had been shown previously to be highly familiar even to kindergarten children -- shopping in a supermarket and making a peanut butter-and-jelly sandwich (Pace, Note 2). One form of each story contained an item inconsistent with children's demonstrated knowledge of such situations, while the other form did not. To determine what information would be inconsistent with normal expectations, groups of second, fourth, and sixth graders were asked to indicate which items in a list would usually be sold in a supermarket and which would not and which items in another list could be used to make a peanut butter-and-jelly sandwich and which would not. Students at each grade level were nearly unanimous in deciding that a color TV set would not be sold in a supermarket and that ice cream would not be used on a peanut butter-and-jelly sandwich.

A 35 mm slide of each story was prepared for the reading condition. For the listeners, the same stories were recorded on a cassette tape recorder by an adult female who had had extensive experience teaching in elementary schools.

Participants

Participants were 84 children in public elementary schools. Twelve children each in kindergarten and the second, fourth, and sixth grades

listened to the stories, while 12 other children in each of grades 2, 4, and 6 read them.

Procedure

Each child was seen individually by the experimenter at an initial session which lasted approximately one-half hour. The readers sat 45 cm (18 in) in front of the screen of a Singer Caramate II projector on which the story slides were shown. Participants were first tested for their knowledge of the words in the stories in order to determine if they could read them all readily. One second grader, who had difficulty reading many of them, was consequently replaced by a classmate who could read the words. Following a practice story used to accustom them to the procedure to be employed, readers were shown a script-consistent story about one of the familiar situations and one script-inconsistent story about the other. Order of presentation was counter-balanced for both story situation and story type. Participants were instructed to read each story so that they could understand it adequately; they were urged not to rush. Comprehension questions about each story were asked after that story slide had been viewed. One of these questions probed for awareness of the anomalous information. One week later, students were requested to recall all they could about each story. Their recall protocols were recorded on a cassette tape, as well as written by the experimenter in a scoring booklet. The procedure for the listeners was similar, except that they heard the tape-recorded stories instead of reading them.

Results

Scoring

To determine whether children were aware of the script-inconsistent

information at recall, their protocols were transcribed and then checked for the presence or absence of the anomalous item. A simple dichotomous rating of "yes" or "no" was given, as appropriate. In order to score the recall protocols themselves, a method was devised to count the separate items of information in each passage. The practice of counting "pausal" or idea units, as utilized by Johnson (1970) or Brown and Smiley (1977) was thought to be too insensitive to text structure and to the situation in which many discrete pieces of information could be contained within a single unit or phrase, as when a noun is qualified by several descriptive adjectives. On the other hand, a detailed propositional or textual analysis was thought to be too complex for the purposes of this study. Instead, a procedure was used which had some of the simpler features of a propositional analysis, but which also acknowledged some of the properties of text cohesion as described by Halliday and Hasan (1976). For example, an initial mention of "a black cat" would be seen as containing two pieces of information, while a later reference to "the black cat" would count as only one since the cat had already been given a specific identity through its prior mention.

This procedure was explained to a class of college students who were each then given a sheet with one of the passages written on it. The students were asked to indicate what they thought were the separate pieces of information in each sentence. On the basis of this information, the number of different items of information for each form of each story was determined. The separate items for each story were listed on a scoring sheet and each child's protocols were checked to determine which items

had been included. The proportion of items recalled for each story was then noted. One half of the participants' protocols were scored by an independent rater, and an inter-rater reliability coefficient of .98 was obtained.

Analyses

Awareness of anomaly. For each occasion, after initial presentation and at recall, chi-square tests were used to compare the proportion of children in each grade who were aware of the inconsistent script information. These tests were performed for readers and listeners separately, and for readers and listeners combined, for those grades for which this was possible (second, fourth, and sixth). An equivalent proportion of the readers in each grade - eight of the 12 - initially reported the inconsistent information. Although six more readers across all grades failed to mention the anomalous item at recall, this chi-square test still was not significant, $\chi^2(2) = 0.67$, $p < .72$. Results were quite different for the listeners, however. The chi-square tests for both occasions were significant -- $\chi^2(3) = 20.472$, $p < .001$, initially, and $\chi^2(3) = 14.275$, $p < .003$, at recall. On the first occasion, eight of the kindergartners and nine of the second graders failed to notice the inconsistent information, compared to none of the fourth graders and only two sixth graders. These results were essentially unchanged at recall, although three more of the older students omitted mention of the anomalous item. Across all grades, however, a z-test for independent samples showed no difference between the proportions of readers and listeners aware of the anomaly on both occasions. A similar z-test for dependent samples indicated that the proportion of all students who detected the inconsistencies initially did not differ significantly from the proportion of those who did so a week later.

Recall of story information. The amount of story information recalled from each kind of story (script-consistent or inconsistent) by students in each grade was compared in separate analyses of variance for readers, listeners, and readers and listeners together. Arc sine transformations were performed on the proportions of story items recalled. For readers, the 4 (grade) X 2 (story-type) analysis of variance, with repeated measures on the second factor, produced significant results only for grade, F (2,33) = 5.00, $p < .01$. A similar result was obtained with the listeners, with the ANOVA producing a significant grade effect, F (3,44) = 8.98, $p < .001$. Likewise, a 3 (grade) X 2 (mode of presentation) X 2 (story-type) analysis of variance, which included both readers and listeners from the second, fourth, and sixth grades, produced a significant grade effect, F (2,66) = 7.02, $p < .002$. With this more powerful test, the story factor approached significance, F (1,66) = 3.89, $p < .053$. In each instance (readers and listeners separately or together), a somewhat greater proportion of information was recalled for the consistent story than for the inconsistent one. The significant grade effect, in each analysis, is attributable to the greater amount recalled by older children (fourth and sixth graders) compared to the younger students (kindergartners and second graders).

Discussion

The results of this investigation suggest that children's awareness of unusual information may be influenced by whether they read or listen to the story in which it is embedded and that this difference may be sensitive to developmental factors. Approximately equivalent proportions of readers in each of grades 2, 4, and 6 noticed items inconsistent with usual expectations, both after initial presentations of the stories and at recall.

However, younger children who listened to the same stories were much less aware of the inconsistent information than fourth and sixth-grade listeners. Even though the listeners included children in kindergarten, the performance of second-grade listeners was comparable. Only three of 12 second-grade listeners detected the anomaly, compared to eight of the 12 second-grade readers. Thus Olson and Hildyard's (in press) suggestion that information which cannot be obtained from existing knowledge might be better understood if presented in writing, rather than orally, receives some support from the results reported here. If younger readers were having to devote more attention to recognizing words than were older students, an opposite result might have been expected, if this additional attention had detracted from comprehension. Perhaps, however, second-grade readers were attending to words more deliberately than the presumably more fluent readers in the higher grades, and thus they might have become more aware of script-inconsistent information than their age-mates who listened to the stories.

Little support was found for the contention that children would be less aware of unusual information with the passage of time than initially, since the proportions of students who detected the inconsistencies on both occasions were similar. It may be that the anomalous items were salient because they did violate usual expectations and thus they tended to be remembered. Similar results have recently been obtained by Bower et al. (1979) with adults who read script-based stories. These authors utilized three kinds of "script interruptions" -- "obstacles," "distractions," and "errors." An obstacle was defined as a situation which blocked the progress of a script, a distraction as an "interesting incident" which suspended the goal of the script temporarily, and an error as a relatively minor incorrect

outcome of an event. Consistent with their predictions, script interruptions overall were remembered better than script actions or script irrelevant information, and this result was produced primarily by the obstacles and distractions. Bower et al. (1979) suggest that such interruptions are better recalled because they are both important to the progress of the script and unexpected; thus they require more attention and deeper processing.

The anomalies used in the stories in this study appear to be most like the "errors" employed by Bower et al. (1979), in that they were "incorrect" from the perspective of the corresponding script but they did not interfere with the flow of events. However, they had been empirically determined to be surprising or inconsistent with expectations, not merely incorrect. Thus they may have been less salient than the obstacles and distractions used by Bower et al. (1979), but more so than their errors. This perhaps moderate degree of saliency may account, in part, for the difference in results between reading and listening conditions. With the more ephemeral auditory presentation, script anomalies which may be surprising but that do not interfere with the unfolding of events may more easily be overlooked than when written presentations are viewed.

Analysis of the amount of story information recalled produced only the common finding (e.g., Brown et al., 1977; Stein & Glenn, 1979) that older elementary-school children remember more about stories than younger ones, although there was some suggestion that recall of script-consistent stories was better than that of script-inconsistent ones. The failure to find an appreciable decrement in recall for inconsistent stories and the

apparent absence of a tendency to "normalize" stories indicate that younger (second-grade) children can be sensitive to story information even when it violates their ordinary expectations for familiar situations, provided, perhaps, that they read the stories. Thus children who read stories consistent with their own experiences can use story information, as well as their own knowledge, to comprehend them.

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